

REMARKS

Applicant thanks the Examiner for the through examination of the application of this application. The Office Action, however, has rejected all pending claims. Specifically, claims 9-10 and 12-19 are rejected under 35 U.S.C. 112, first paragraph, as allegedly failing to comply with the written description requirement. Claims 9-10 and 12-19 are rejected under 35 U.S.C. 112, second paragraph, as allegedly failing to particularly point out and distinctly claim the subject matter which applicant regards the invention. Claims 9, 12-14 and 16-19 are rejected under 35 U.S.C. 102(e) as allegedly anticipated by Chang et al (U.S. 7,030,952). Claims 10 and 15 are rejected under 35 U.S.C. 103(a) as allegedly unpatentable over Chang et al (U.S. 7,030,952).

In this paper, claims 9, 13, 14, and 20 are amended. Claims 18 and 21 are canceled.

Rejections under 35 U.S.C. 112, first paragraph

Claims 9-10 and 12-19 stand rejected under 35 U.S.C. 112, first paragraph, as allegedly failing to comply with the written description requirement. In this regard, the Office Action indicates that the claims fail to comply with the written description requirement. As set forth above, Applicant has amended the specification and respectfully asserts that the objection has been accommodated and rendered moot by the amendments made herein. It is noted that the specification amendments are based on the content of the original figures, and therefore the amendments add no new matter to the application.

Rejections under 35 U.S.C. 112, second paragraph

Claims 9-10 and 12-19 stand rejected under 35 U.S.C. 112, second paragraph, as allegedly failing to particularly point out and distinctly claim the subject matter which Applicant regards the

invention. In this regard, the Office Action indicates that the claims contain various informalities. As set forth above, Applicant has amended the claims to address and overcome these objections. Specifically, Applicant has amended claims 9 and 14 to correct their informalities.

Rejections Under 35 U.S.C. 102(e)

Claims 9, 12-14 and 16-19, stand rejected under 35 U.S.C. 102(e) as allegedly anticipated by Chang et al (U.S. 7,030,952). Applicant asserts that amended claim 9 is patentable for at least the reasons discussed below.

Independent claim 9, as amended herein, recites:

9. An interconnect structure, comprising:
a substrate having a surface;
a dielectric layer disposed on the surface of the substrate;
a first metal line disposed in the dielectric layer, having a first and second end, wherein the direction extending from the first end to the second end is parallel to the substrate surface;
a second metal line disposed on the dielectric layer, wherein the second metal line is separated from the first metal layer by the dielectric layer; and
a plurality of conductive plugs arranged along the first metal line,
disposed in the dielectric layer and on the first end of the first metal line to
electrically connect the second metal line,
wherein the first metal line and the second metal line are a gate metal layer and a source/drain metal layer of a TFT array respectively.

(Emphasis Added). Claim 9 patentably defines over the cited art for at least the reason that the cited art fails to disclose the features emphasized above.

As is clearly recited in claim 9, the interconnect structure in amended claim 9 comprises a ***plurality of conductive plugs*** arranged along the first metal line, disposed in the dielectric layer and on the first end of the first metal line to ***electrically connect the second metal line.***

In page 4, the Office Action asserts that “regarding claim 9..., Chang teaches a plurality of conductive plugs 222 (see figure 8) parallel to extending direction of the first metal layer disposed

on the first end of the first metal layer...". Applicant disagrees. In this regard, referring to Figure 8, Chang teaches the contact plugs c' and c' connects different metal lines. Chang does not teach or suggest **a plurality of conductive plugs** arranged the first metal line, disposed in the dielectric layer and on the first end of the first metal line to **electrically connect the second metal line** in amended claim 9. For at least this reason, the rejection should be withdrawn.

MPEP section 2131 (TO ANTICIPATE A CLAIM, THE REFERENCE MUST TEACH EVERY ELEMENT OF THE CLAIM) recites:

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). >"When a claim covers several structures or compositions, either generically or as alternatives, the claim is deemed anticipated if any of the structures or compositions within the scope of the claim is known in the prior art." Brown v. 3M, 265 F.3d 1349, 1351, 60 USPQ2d 1375, 1376 (Fed. Cir. 2001) (claim to a system for setting a computer clock to an offset time to address the Year 2000 (Y2K) problem, applicable to records with year date data in "at least one of two-digit, three-digit, or four-digit" representations, was held anticipated by a system that offsets year dates in only two-digit formats). See also MPEP § 2131.02.< **"The identical invention must be shown in as complete detail as is contained in the ... claim."** Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). The elements must be arranged as required by the claim, but this is not an ipsissimis verbis test, i.e., identity of terminology is not required. In re Bond, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990). Note that, in some circumstances, it is permissible to use multiple references in a 35 U.S.C. 102 rejection. See MPEP § 2131.01.

It is clear that not every element expressly set forth in the amended claim 9 is found in Chang. Consequently, Applicant respectfully submits that the cited reference fails to disclose the feature above-discussed in the present invention as set forth in amended claim 9. Reconsideration of this rejection is hereby respectfully requested.

As amended, independent claim 14 recites:

14. An interconnect structure, comprising:

a substrate having a surface;
a dielectric layer disposed on the surface of the substrate;
a first metal line disposed in the dielectric layer, having a first and second end, wherein the direction extending from the first end to the second end is parallel to the substrate surface;;
a second metal line disposed on the dielectric layer; and
a plurality of plugs arranged along the first metal line, disposed on the first end of the first metal line, wherein ***at least one of the plugs farther from the first end of the metal line is conductive, and electrically connects the second metal line.***

(Emphasis Added). Claim 14 patently defines over the cited art for at least the reason that the cited art fails to disclose the features emphasized above.

As expressly recited, the interconnect structure in amended claim 14 comprises ***a plurality of plugs arranged along the first metal line***, disposed on the first end of the first metal line, wherein ***at least one of the plugs farther from the first end of the metal line is conductive, and electrically connects the second metal line.*** In page 4, the Office Action asserts that “regarding claim 14...Chang teaches a plurality of conductive plugs 222 (see figure 8) parallel to extending direction of the first metal layer disposed on the first end of the first metal layer...”

In this regard, referring to Figure 8, Chang teaches the contact plugs c' and c' arranged along different metal lines. Chang does not teach or suggest ***a plurality of plugs arranged along the first metal line***, disposed on the first end of the first metal line, wherein ***at least one of the plugs farther from the first end of the metal line is conductive, and electrically connects the second metal line*** in amended claim 14.

It is clear that not every element as set forth in the amended claim 14 is found in Chang. Consequently, applicant respectfully submits that the cited reference fails to disclose the feature above-discussed in the present invention as set forth in amended claim 14. Reconsideration of this rejection is hereby respectfully requested.

For at least the foregoing reasons, amended claims 9 and 14 are allowable over the cited references. Insofar as claims 12-13 and 16-17 depend from amended claims 9 and 14 respectively, these claims are also allowable at least by virtue of their dependency.

Rejections Under 35 U.S.C. 103(a)

Claims 10 and 15 stand rejected under 35 U.S.C. 103(a) as allegedly unpatentable over Chang et al (U.S. 7,030,952). As claims 10 and 15 depend from allowable claims 9 and 14, these claims are patentable at least by virtue of their dependency.

Independent claim 20

With regard to independent claim 20, as amended, this claim recites:

20. An interconnect structure, comprising:
a substrate;
a first dielectric layer disposed the substrate;
a first metal line disposed in the dielectric layer, having a first and second end, wherein the direction extending from the first end to the second end is parallel to the substrate surface;
a first plug and a second plug disposed on first the first end of the first metal line, wherein the first plug is closer to the first end than the second plug;
a second metal line disposed on the first dielectric layer, connecting the first metal line through the second plug;
a second dielectric layer disposed on the first dielectric layer and the second metal line, filling the first plug.

(Emphasis Added). Claim 20 patently defines over the cited art for at least the reason that the cited art fails to disclose the features emphasized above.

As expressly recited in the claim, amended claim 20 comprises a first plug and a second plug disposed on the first end of the first metal line, and the first plug is filled with a dielectric layer, thus ***the second metal line not connect to the first plug***, as shown in Figures 3A and 3B.

Simply stated, Chang fails to teach or suggest the second metal line not connecting to the first plug. Therefore, for at least this reason, amended claim 20 patentably defines over Chang.

Conclusion

All pending claims are believed to be in condition for allowance, and the Examiner is respectfully requested to pass those claims to issuance. If the Examiner believes a teleconference will expedite the examination of this application, the Examiner is invited to contact the undersigned attorney at 770-933-9500.

No fee is believed to be due in connection with this Amendment and Response to Office Action. If, however, any fee is deemed to be payable, you are hereby authorized to charge any such fee to deposit account 20-0778.

Respectfully submitted ,

**THOMAS, KAYDEN, HORSTEMEYER
& RISLEY, L.L.P.**

By:


Daniel R. McClure, Reg. No. 38,962

100 Galleria Parkway
Suite 1750
Atlanta, Georgia 30339-5948
(770) 933-9500

eric
Annotated Sheet

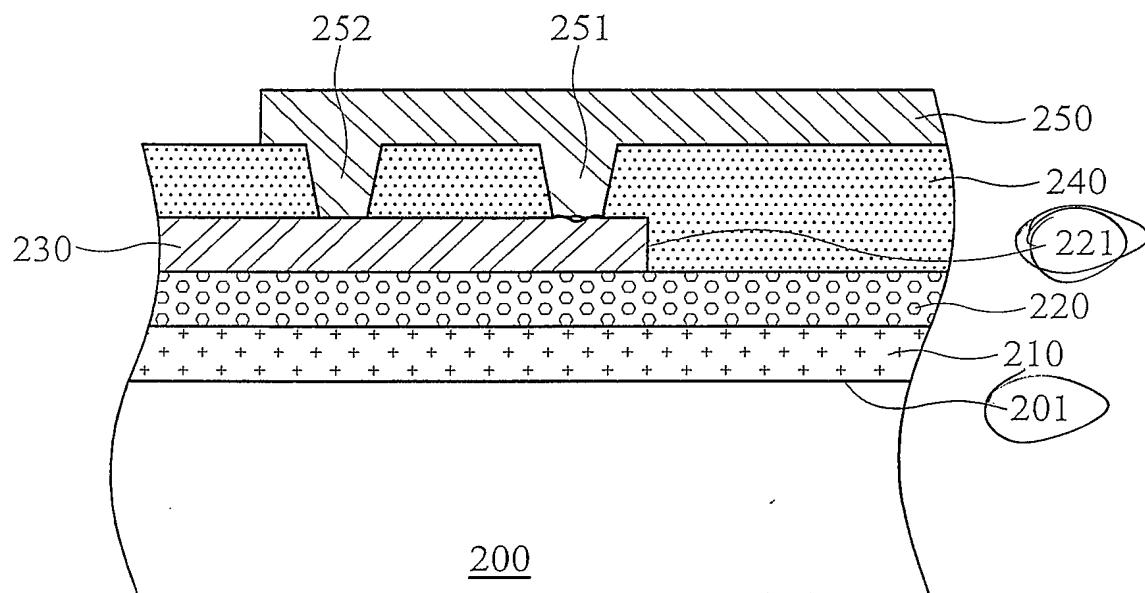


FIG. 2C

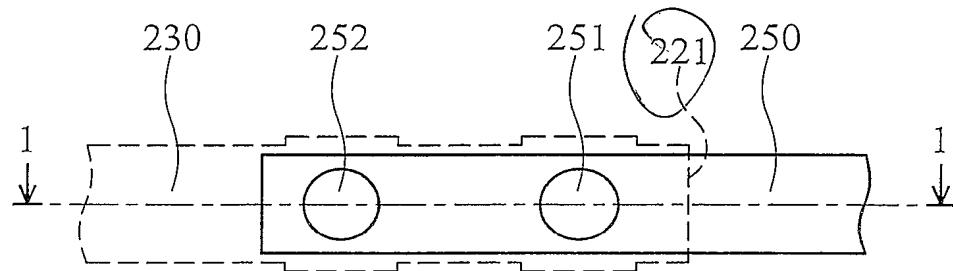


FIG. 2D

Annotated Sheet

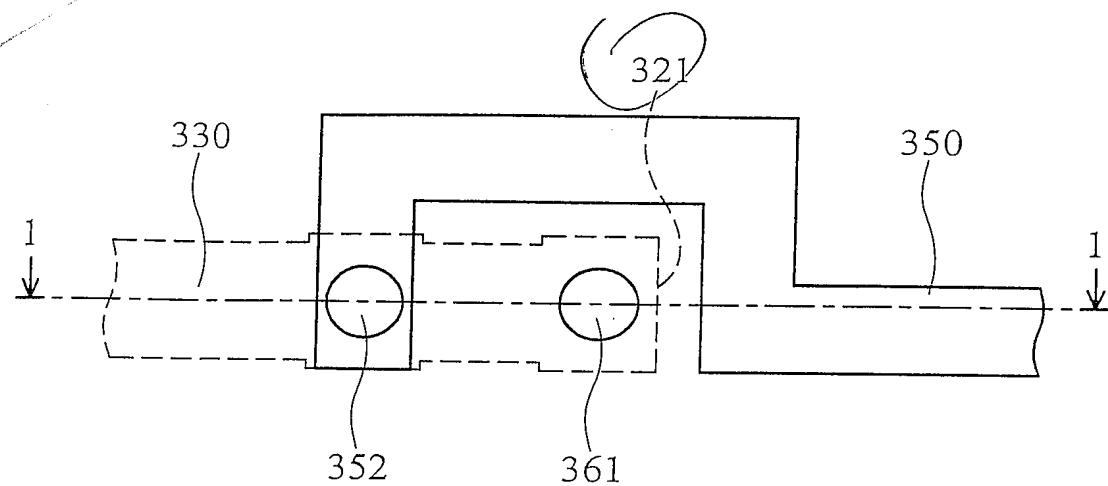


FIG. 3A

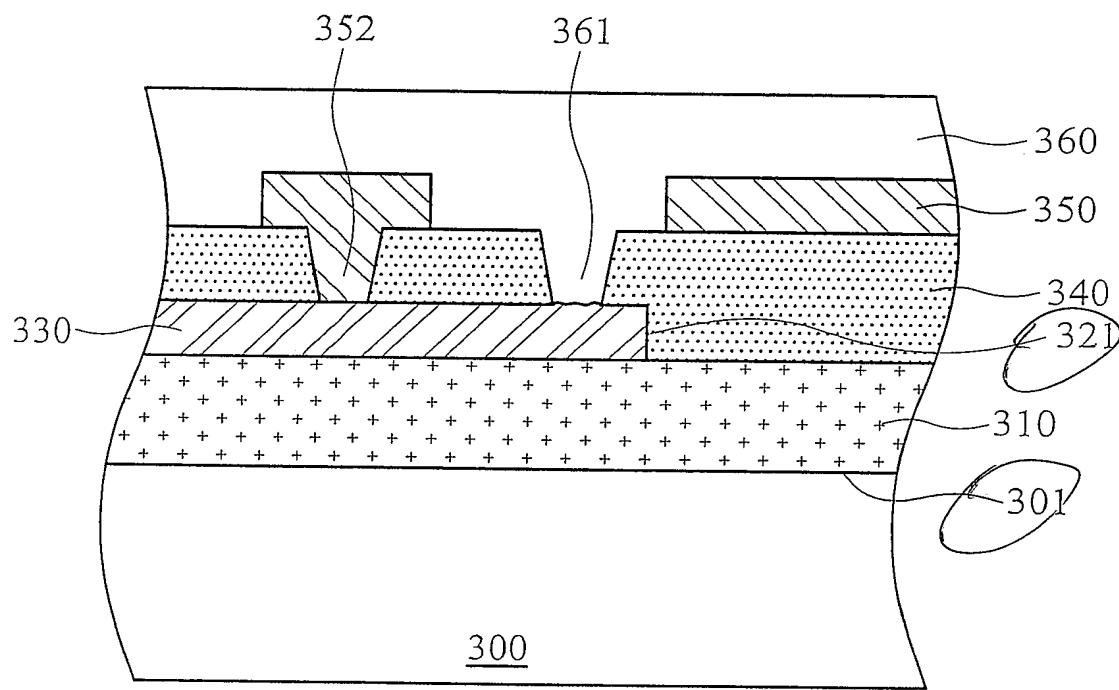


FIG. 3B